

66133

3N261  
3N262  
3N263

TO-18 OPTOCOUPLERS



05/29/03

**Features:**

- High Reliability
- Electrically similar to 4N47, 4N48, 4N49
- Base lead eliminated for improved noise immunity
- Rugged package
- +1kV electrical isolation
- Stability over wide temperature range

**Applications:**

- Eliminate ground loops
- Level shifting
- Line receiver
- Switching power supplies
- Motor control

**DESCRIPTION**

The **66133** contains an infrared LED optically coupled to a silicon phototransistor in a hermetic 4 lead TO-18 package. The collector of the phototransistor is electrically connected to the case. The internal base connection has been eliminated for improved noise immunity. The 3N261, 3N262 and 3N263 can be supplied to commercial or screened quality levels as well as to customer specifications.

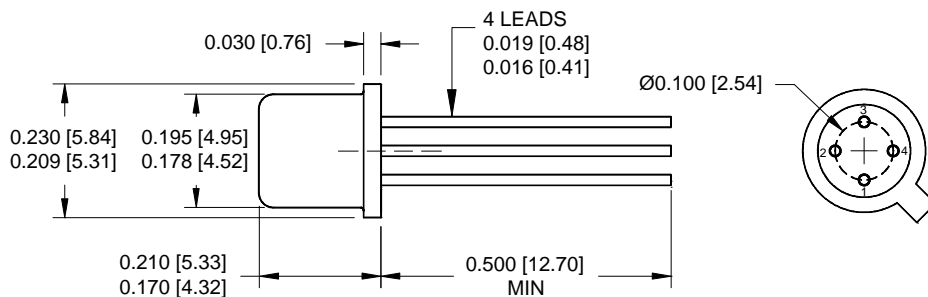
**ABSOLUTE MAXIMUM RATINGS**

Input to Output Voltage .....	1000V
Emitter-Collector Voltage .....	7V
Collector-Emitter Voltage .....	40V
Reverse Input Voltage .....	2V
Input Diode Continuous Forward Current at (or below) 65°C Free-Air Temperature (see note 1) .....	40mA
Continuous Collector Current .....	20mA
Continuous Transistor Power Dissipation at (or below) 25°C Free-Air Temperature (see Note 2) .....	190mW
Storage Temperature .....	-55°C to +150°C
Operating Free-Air Temperature Range .....	-55°C to +125°C
Lead Solder Temperature (10 seconds max, 1/16" from case) .....	240°C

**Notes:**

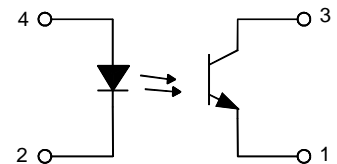
1. Derate linearly to 125°C free-air temperature at the rate of 0.67 mA/°C.
2. Derate linearly to 125°C free-air temperature at the rate of 1.9 mW/°C.

**Package Dimensions**



ALL DIMENSIONS ARE IN INCHES [MILLIMETERS]

**Schematic Diagram**



THE COLLECTOR IS IN ELECTRICAL CONTACT WITH THE CASE.

**66133**    **3N261**  
               **3N262**  
               **3N263**

**TO-18 OPTOCOUPLERS**

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**ELECTRICAL CHARACTERISTICS**

**INPUT LED**

T<sub>A</sub> = 25°C

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Input Diode Static Reverse Current	I <sub>R</sub>			100	nA	V <sub>R</sub> = 2V
Input Diode Static Forward Voltage	V <sub>F</sub>	0.8		1.5	V	I <sub>F</sub> = 10mA

**OUTPUT TRANSISTOR**

T<sub>A</sub> = 25°C

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	40			V	I <sub>C</sub> = 1mA, I <sub>F</sub> = 0
Emitter-Collector Breakdown Voltage	V <sub>(BR)ECO</sub>	7			V	I <sub>E</sub> = 100μA, I <sub>F</sub> = 0
Collector Dark Current	I <sub>D</sub>			100	nA	V <sub>CE</sub> = 20V, I <sub>F</sub> = 0mA

**COUPLED CHARACTERISTICS**

T<sub>A</sub> = 25°C

PARAMETER		SYMBOL	MIN	TYP	MAX	UNITS	TEST CONDITIONS
On State Collector Current	3N261	I <sub>C(ON)</sub>	0.5			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 1mA
On State Collector Current	3N262	I <sub>C(ON)</sub>	1			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 1mA
On State Collector Current	3N263	I <sub>C(ON)</sub>	2			mA	V <sub>CE</sub> = 5V, I <sub>F</sub> = 1mA
Collector-Emitter Saturation Voltage	3N261 3N262 3N263	V <sub>CE(SAT)</sub>			0.3 0.3 0.3	V V V	I <sub>F</sub> = 2mA, I <sub>C</sub> = 0.5mA I <sub>F</sub> = 2mA, I <sub>C</sub> = 1mA I <sub>F</sub> = 2mA, I <sub>C</sub> = 2mA
Rise Time	3N261 3N262 3N263	t <sub>r</sub>		10 10 15	20 20 25	μs μs μs	V <sub>CE</sub> = 10V, I <sub>F</sub> = 5mA, R <sub>L</sub> = 100Ω
Fall Time	3N261 3N262 3N263	t <sub>f</sub>		10 10 15	20 20 25	μs μs μs	V <sub>CE</sub> = 10V, I <sub>F</sub> = 5mA, R <sub>L</sub> = 100Ω
DC Isolation Voltage		V <sub>IO</sub>	1000			V	I <sub>Q</sub> = 100 nA

**RECOMMENDED OPERATING CONDITIONS:**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Input Current, Low Level	I <sub>FL</sub>	0	10	μA
Input Current, High Level	I <sub>FH</sub>	1	20	mA
Supply Voltage	V <sub>CE</sub>	5	10	V

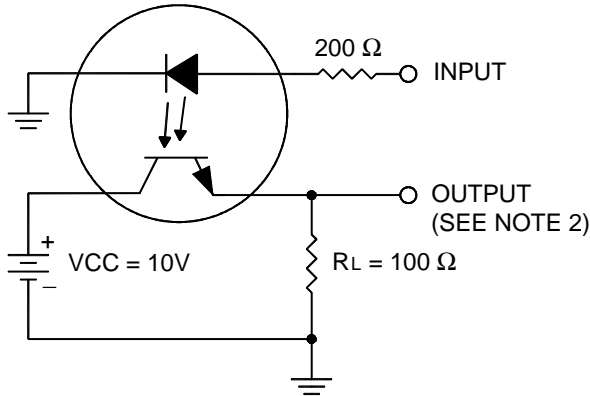
**SELECTION GUIDE**

PART NUMBER	PART DESCRIPTION
66133-001	3N261, Commercial
66133-002	3N262, Commercial
66133-003	3N263, Commercial
66133-101	3N261, Screened
66133-102	3N262, Screened
66133-103	3N263, Screened

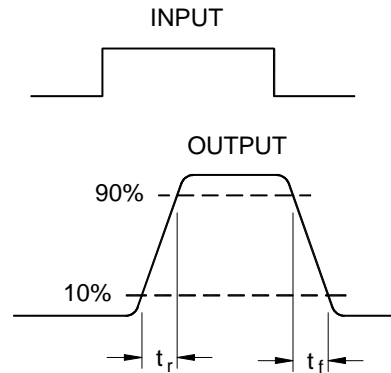
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PARAMETER MEASUREMENT INFORMATION

ADJUST AMPLITUDE OF INPUT PULSE FOR  $I_{F(ON)} = 5 \text{ mA}$



TEST CIRCUIT

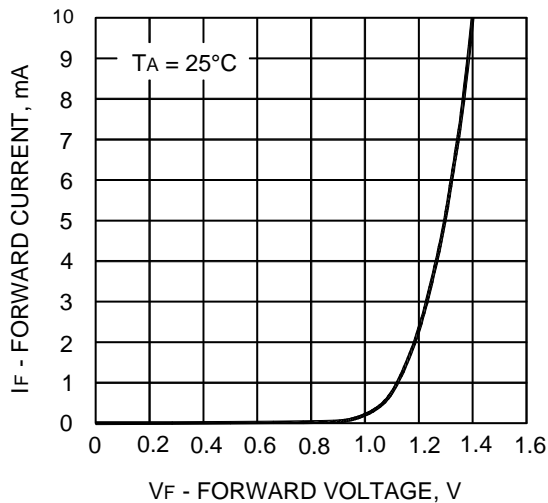


VOLTAGE WAVEFORM

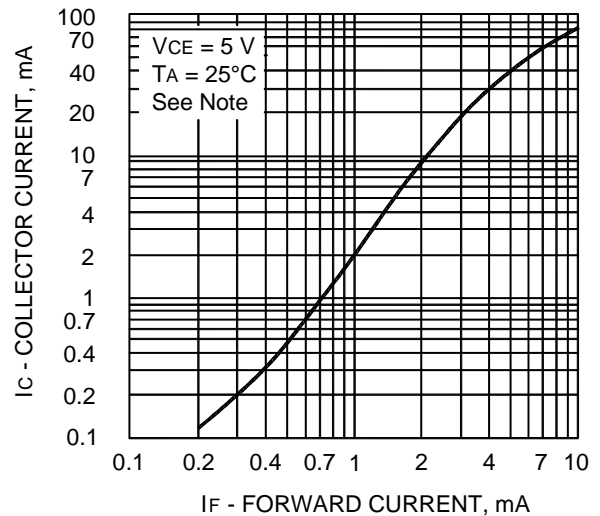
- NOTES: 1. The input waveform is supplied by a generator with the following characteristics:  $Z_{OUT} = 50 \Omega$ ,  $t_r \leq 15 \text{ ns}$ , Duty cycle  $\approx 1\%$ ,  $t_w = 100 \mu\text{s}$ .  
 2. Waveforms are monitored on an oscilloscope with the following characteristics:  $t_r \leq 12 \text{ ns}$ ,  $R_{IN} \geq 1M\Omega$ ,  $C_{IN} \leq 20 \text{ pF}$

TYPICAL CHARACTERISTICS

INPUT DIODE FORWARD CONDUCTION CHARACTERISTICS



3N262  
 COLLECTOR CURRENT  
 vs  
 INPUT DIODE FORWARD CURRENT



NOTE: This parameter was measured using pulse techniques.  $t_w = 100 \mu\text{s}$ , duty cycle = 1%.

05/29/03

TYPICAL CHARACTERISTICS (CONTINUED)

